

AMENDMENTS TO THE CLAIMS

1-17. (Canceled)

18. (Withdrawn) A rolling bearing with sensor, comprising;

an inner ring;

an outer ring;

a plurality of rolling elements disposed between said inner and outer rings;

a retainer for retaining said rolling elements;

a sensor having a detecting part detecting at least one of a rotating speed, a vibration, a temperature and a humidity, a transmitting part transmitting an output of said detecting part or a signal obtained by processing said output, a control part controlling said transmitting part based on the output of said detecting part, and a power source for supplying a power to said detecting part, said transmitting part and said control part; and

a receiving device disposed apart from said transmitting part attached to said rolling bearing, for receiving said output or said signal transmitted from said transmitting part.

19. (Withdrawn) The rolling bearing with sensor according to claim 18, wherein said detecting part, said transmitting part and said control part are disposed on one of said inner and outer rings, and

said power source is disposed on a member for fixing said one of said inner and outer rings.

20. (Withdrawn) The rolling bearing with sensor according to claim 18, further comprising:

a shield for protecting a rolling surface of said inner and outer rings and said rolling elements,

wherein said detecting part, said transmitting part and said control part are disposed on said shield, and said power source is disposed on one of inner and outer rings supporting said

shield.

21. (Withdrawn) The rolling bearing with sensor according to claim 18, wherein said detecting part, said transmitting part, said control part and said power source are disposed on one of said inner and outer rings.

22. (Withdrawn) The rolling bearing with sensor according to claim 18, further comprising:

a shield for protecting a rolling surface of said inner and outer rings and said rolling elements,

wherein said detecting part, said transmitting part, said control part and said power source are mounted on a printed circuit board to form a sensor unit, and

said sensor unit is disposed on one of said shield, said inner ring and said outer ring, or both of said shield and one of said inner and outer rings.

23. (Withdrawn) The rolling bearing with sensor according to claim 18, further comprising:

a shield supported on one of said inner and outer rings, for protecting a rolling surface of said inner and outer rings and said rolling elements, said shield including said detecting part, said transmitting part, said control part and said power source attached thereto; and

a protecting cover attached to said shield, for covering said transmitting part, said control part and said powersource.

24. (Withdrawn) The rolling bearing with sensor according to claim 18, further comprising:

a ring secured to one of said inner and outer rings, for mounting said detecting part, said transmitting part, said control part and said power source.

25. (Withdrawn) The rolling bearing with sensor according to claim 18, wherein said

transmitting part transmits a constant signal at predetermined intervals, and said receiving device receives said constant signal, for confirming that said sensor including said detecting part, said transmitting part and said control part are functioned normally.

26. (Withdrawn) The rolling bearing with sensor according to claim 25, wherein said transmitting part transmits different kinds of identification information including the signal transmitting when said detecting part detects an abnormal operation and the signal transmitting at said predetermined intervals when said sensor is normally operated.

27. (Withdrawn) The rolling bearing with sensor according to claim 25, wherein said power source supplies the power to said transmitting part when said transmitting part transmits the radio wave.

BL Contd

28-44. (Canceled)

45. (Withdrawn) A ring with sensor for a rolling bearing in which a pair of raceway rings rotate relative to each other through rolling elements disposed therebetween,

wherein said ring with sensor is disposed so as to rotate together with one of said raceway rings, and

wherein said ring with sensor comprises:

a detecting part detecting at least one of a rotating speed, a vibration, a temperature and a humidity;

a transmitting part transmitting an output of said detecting part or a signal obtained by processing the output;

a control part controlling said transmitting part based on the output of said detecting part; and

a power source for supplying a power to said detecting part, said transmitting part and said control part.

46. (Withdrawn) The ring with sensor according to claim 45, wherein said transmitting part transmits a constant signal at predetermined intervals, and said constant signal is received by a receiving device disposed apart from said transmitting part, for confirming that said detecting part, said transmitting part and said control part are functioned normally.

47. (Currently Amended) A rolling bearing, comprising:

an inner ring;

an outer ring;

a plurality of rolling elements disposed between said inner ring and said outer ring;

a retainer for retaining said rolling elements; and

~~a sensor having a detecting part detecting at least one of a temperature and a vibration;~~

and

a ring secured to at least one of said inner ring and said outer ring, wherein said ring includes:

a sensor having a detecting part, said detecting part detecting at least one of a temperature and a vibration,


a transmitting part transmitting an output of said detecting part or a signal obtained by processing said output,

a control part controlling said transmitting part on the basis of said output of said detecting part, and

a power source for supplying power to said detecting part and said transmitting part.

48. (Previously Presented) The rolling bearing according to claim 47, wherein: said transmitting part transmits a constant signal at predetermined intervals; and a receiving device, apart from said transmitting part, receives said constant signal for confirming that said sensor, said transmitting part, and said control part, operate normally.

49. (New) A rolling bearing with sensor, comprising:
an inner ring;
an outer ring;
a plurality of rolling elements disposed between said inner and outer rings; and
a sensor having a detecting part detecting a state of said rolling bearing and a circuit part connected to said detecting part,
wherein said detecting part and said circuit part are attached to said rolling bearing, and
wherein at least one of said detecting part and said circuit part is attached to at least one of said inner and outer rings along a circumferential direction thereof.

 50. (New) A rolling bearing with sensor, comprising:
an inner ring;
an outer ring;
a plurality of rolling elements disposed between said inner and outer rings; and
a sensor having a detecting part detecting a state of said rolling bearing and a circuit part connected to said detecting part,
wherein said detecting part and said circuit part are attached to said rolling bearing, and
wherein at least one of said detecting part and said circuit part is attached to an end face of at least one of said inner and outer rings.

51. (New) The rolling bearing with sensor according to claim 50, further comprising:
a cover attached to said one of said inner and outer rings having said detecting part, for covering said detecting part.

52. (New) A rolling bearing with sensor, comprising:
an inner ring;
an outer ring;
a plurality of rolling elements disposed between said inner and outer rings;
a sensor having a detecting part detecting a state of said rolling bearing and a circuit part connected to said detecting part; and
a printed circuit board mounting said detecting part and said circuit part, said printed circuit board being attached to a surface of at least one of said inner and outer rings,
wherein said detecting part and said circuit part are attached to said rolling bearing.

53. (New) A rolling bearing with sensor, comprising:
an inner ring;
an outer ring;
a plurality of rolling elements disposed between said inner and outer rings; and
a sensor having a detecting part detecting a state of said rolling bearing and a circuit part connected to said detecting part,
wherein said detecting part and said circuit part are attached to said rolling bearing,
wherein said sensor detects at least one of a rotating speed, a vibration, a temperature and a humidity,
wherein at least one of said detecting part and said circuit part is attached to said outer ring along a circumferential direction thereof, and
wherein said outer ring is formed with an annular groove for mounting said circuit part so that said circuit part is disposed inside of a prolongation of an end face of said outer ring and inside of a prolongation of an outer peripheral surface of said outer ring.

54. (New) A rolling bearing with sensor, comprising:

- an inner ring;
- an outer ring;
- a plurality of rolling elements disposed between said inner and outer rings; and
- a sensor having a detecting part detecting a state of said rolling bearing and a circuit part connected to said detecting part,

wherein said detecting part and said circuit part are attached to said rolling bearing,

wherein said sensor detects at least one of a rotating speed, a vibration, a temperature and a humidity,

wherein at least one of said detecting part and said circuit part is attached to said inner ring along a circumferential direction thereof, and

wherein said inner ring is formed with an annular groove for mounting said circuit part so that said circuit part is disposed inside of a prolongation of an end face of said inner ring and outside of a prolongation of an inner peripheral surface of said inner ring.

55. (New) A rolling bearing with sensor, comprising:

- an inner ring;
- an outer ring;
- a plurality of rolling elements disposed between said inner and outer rings; and
- a sensor having a detecting part detecting a state of said rolling bearing and a circuit part connected to said detecting part,

wherein said detecting part and said circuit part are attached to said rolling bearing, and

wherein said detecting part is attached to a recessed part formed by cutting a part of an end face of at least one of said outer and inner rings.

56. (New) The rolling bearing with sensor according to claim 49, wherein said sensor detects at least one of a rotating speed, a vibration, a temperature and a humidity.

57. (New) The rolling bearing with sensor according to claim 50, wherein said sensor detects at least one of a rotating speed, a vibration, a temperature and a humidity.

58. (New) The rolling bearing with sensor according to claim 52, wherein said sensor detects at least one of a rotating speed, a vibration, a temperature and a humidity.

59. (New) The rolling bearing with sensor according to claim 55, wherein said sensor detects at least one of a rotating speed, a vibration, a temperature and a humidity.

60. (New) The rolling bearing with sensor according to claim 52, wherein at least one of said detecting part and said circuit part is molded by an insulating material.

61. (New) The rolling bearing with sensor according to claim 55, wherein at least one of said detecting part and said circuit part is molded by an insulating material.

62. (New) The rolling bearing with sensor according to claim 52, further comprising:
a shield for protecting rolling surfaces of said inner and outer rings and said rolling elements; and
a printed circuit board mounting said detecting part and said circuit part, said printed circuit board being attached to said shield.

63. (New) The rolling bearing with sensor according to claim 55, further comprising:
a shield for protecting rolling surfaces of said inner and outer rings and said rolling elements; and
a printed circuit board mounting said detecting part and said circuit part, said printed circuit board being attached to said shield.

64. (New) The rolling bearing with sensor according to claim 52, further comprising:
a shield for protecting rolling surfaces of said inner and outer rings and said rolling elements; and
a detecting part detecting a humidity and being located within a space surrounded by said inner and outer rings and said shield supported to one of said inner and outer rings.

65. (New) The rolling bearing with sensor according to claim 55, further comprising:
a shield for protecting rolling surfaces of said inner and outer rings and said rolling elements; and
a detecting part detecting a humidity and being located within a space surrounded by said inner and outer rings and said shield supported to one of said inner and outer rings.

66. (New) A rolling bearing with sensor, comprising:
an inner ring;
an outer ring;
a plurality of rolling elements disposed between said inner and outer rings; and
a sensor having a detecting part detecting a state of said rolling bearing and a circuit part connected to said detecting part,
wherein said detecting part and said circuit part are attached to said rolling bearing,
wherein said sensor detects at least one of a rotating speed, a vibration, a temperature and a humidity, and
wherein said detecting part for detecting the vibration includes a detector utilizing a micro mechanism with movable part and fixed part, and a vibration detecting value of said detector is set by changing an elastic modulus of said movable part.

67. (New) The rolling bearing with sensor according to claim 49, further comprising:
a surface-opposed electric generator having a coil provided on one of said inner and outer rings and a magnet provided on the other.

68. (New) The rolling bearing with sensor according to claim 50, further comprising:
a surface-opposed electric generator having a coil provided on one of said inner and outer rings and a magnet provided on the other.

69. (New) The rolling bearing with sensor according to claim 52, further comprising:
a surface-opposed electric generator having a coil provided on one of said inner and outer rings and a magnet provided on the other.

70. (New) The rolling bearing with sensor according to claim 55, further comprising:
a surface-opposed electric generator having a coil provided on one of said inner and outer rings and a magnet provided on the other.

71. (New) The rolling bearing with sensor according to claim 49, wherein said circuit part includes a transmitting part converting a signal detected by said detecting part into a radio wave and transmitting said radio wave.

72. (New) The rolling bearing with sensor according to claim 50, wherein said circuit part includes a transmitting part converting a signal detected by said detecting part into a radio wave and transmitting said radio wave.

73. (New) The rolling bearing with sensor according to claim 52, wherein said circuit part includes a transmitting part converting a signal detected by said detecting part into a radio wave and transmitting said radio wave.

74. (New) The rolling bearing with sensor according to claim 55, wherein said circuit part includes a transmitting part converting a signal detected by said detecting part into a radio wave and transmitting said radio wave.

75. (New) The rolling bearing with sensor according to claim 71, wherein oscillation frequency generated by said transmitting part is selectingly detectable.

76. (New) The rolling bearing with sensor according to claim 72, wherein oscillation frequency generated by said transmitting part is selectingly detectable.

77. (New) The rolling bearing with sensor according to claim 73, wherein oscillation frequency generated by said transmitting part is selectingly detectable.

78. (New) The rolling bearing with sensor according to claim 74, wherein oscillation frequency generated by said transmitting part is selectingly detectable.

Body

79. (New) A rolling bearing with sensor, comprising:
an inner ring;
an outer ring;
a plurality of rolling elements disposed between said inner and outer rings; and
a sensor having a detecting part detecting a state of said rolling bearing and a circuit part connected to said detecting part,
wherein said detecting part and said circuit part are attached to said rolling bearing, and
wherein said circuit part includes an ultrasonic wave generating part converting a signal detected by said detecting part into an ultrasonic wave, and transmitting the converted ultrasonic wave.
